FLORISTIC INVENTORY OF MONT STE MARIE

GATINEAU COUNTY, QUEBEC

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FLORISTIC INVENTORY OF MONT STE MARIE,

GATINEAU COUNTY, QUEBEC.

Mont Ste Marie, a land feature typical of much of the Gatineau Hills section of the Precambrian Shield, is situated about 40 miles due north of Ottawa. Its summit, rising to 1830 feet elevation, creates a sharp divide for two large rivers, the Gatineau (at 460 feet) on the west, and the Lievre (at 630 feet) on the east, that flow southward and essentially parallel at this point.

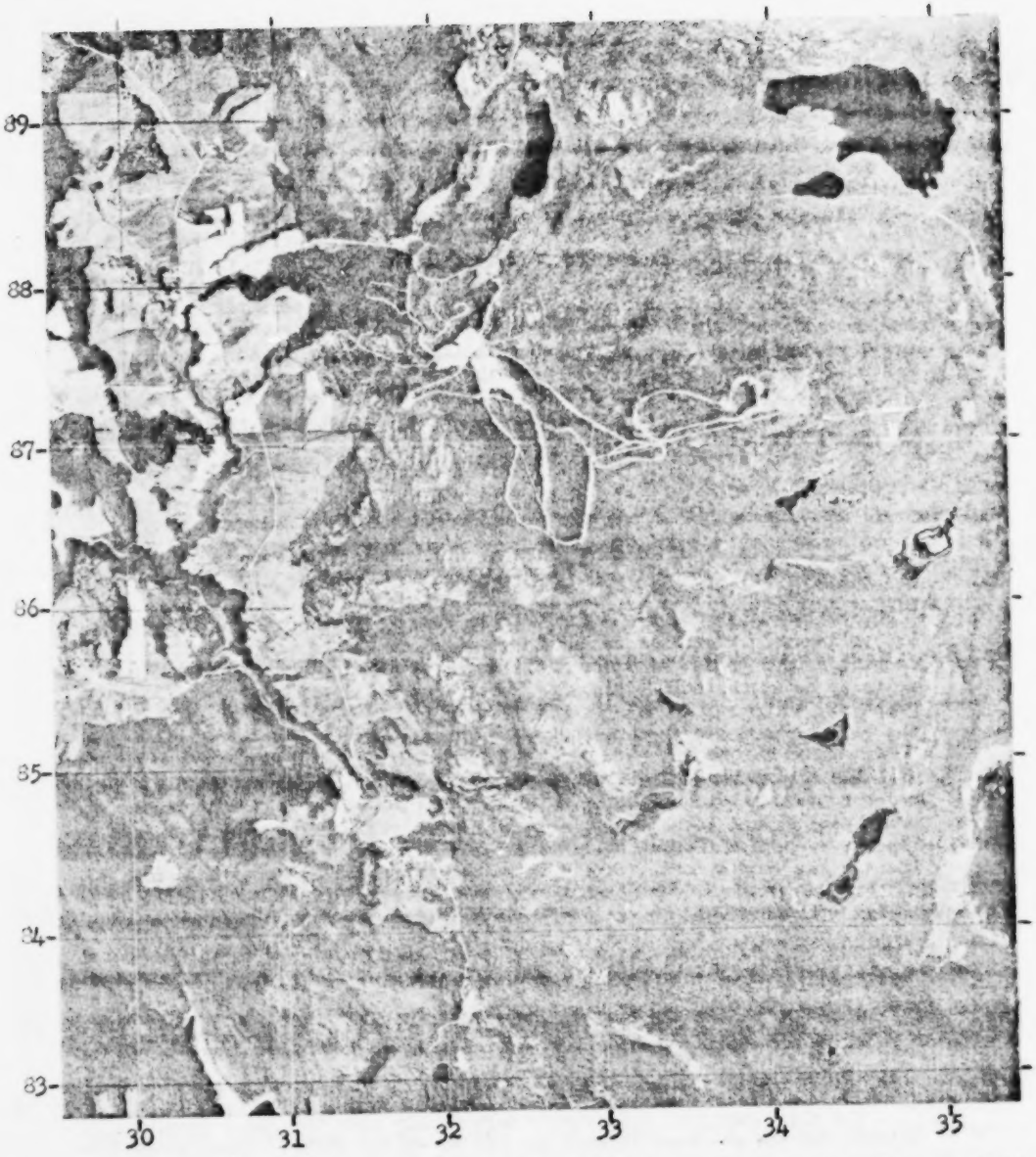
While its height exceeds that of the surrounding ridges and peaks by only some 300 feet, Mont Ste Marie never-the-less can clearly claim the distinction of "The Highest Point in the Gatineau". One would have to go 50 miles northward (Mont Sir Wilfred), 120 miles southward (Adirondacks), or 500 miles westward (Lake Superior upland) to reach land of greater elevation. Mont Ste Marie's distinctive narrow dome stands out on the skyline when viewed from the well-travelled plains to the west and as such has become known as a local landmark.

On account of the ruggedness of the terrain, the slopes of Mont Ste Marie have long stood a wilderness of rock and forest and, despite their relative accessibility from valley roads, have not been overly frequented by sportsmen nor excessively exploited by lumbermen. Presently, the covering vegetation could be said to be representative of the area and in an almost original state.

In 1962-63, a heavy-duty "Radar Road" was blasted and bulldozed to the very summit of Mont Ste Marie. The installation of the tower was not quite completed, however, when the project was abandoned for its designed purpose - and thus an unexpected access facility was left for sight-seers, naturalists and the car-driving public. Such sudden opening-up of a wild natural area, so close to a main highway and to dense centres of population, is a circumstance of this modern age. It was decided to take advantage of it and make a rapid survey of the flora to record the species and their relative abundance in the area, as of 1966. While nothing of unusual botanical significance was expected, such a survey would certify the presence of some species and clarify the geographic limit of others. Numerous species were thought to run-out on the escarpment of the Precambrian Shield just a few miles to the south, but this had to be proven.

MONT STE MARIE and surrounding terrain. The area of survey is confined within the kilometre grid-lines 31, 37, 84 and 90. x = collecting site.

(From MAP SHEET 30 G/13 LOW of National Topographic Series)



Aerial photo taken 22 June, 1966, showing all of Mont Ste Marie and some of the farmland (about 500 ft. elev.) at its western base. The Radar Road ascends to the summit (1830 ft.) at right; the newly created ski-runs and tow-lanes on the northwest slopes converge on the main lodge site (about 720 ft.) on freshly leveled gravel-sand deposit. Grid-lines approximating the topographic map are marked in. The picture covers most of the block selected for botanical reconnaissance.

(Mines & Technical Surveys air-photo: A19518-125)

The Mont Ste Marie Company, a well organized syndicate under John Clifford, President and General Manager, acquired in 1965 full title to the land, an over-2000 acre block including the summit and slopes on the west and north, also Lake Fournier and much of the flat land at the base, for development as a year-round resort, initially as a winter season ski-resort. By the fall of 1966, various ski runs were ready for operation with a modern chair-lift installed to the top of Ryan Peak along the ridge just west of the main summit. Fortunately, the objectives of this enterprising concern are both to attract as many as the recreation-seeking public as possible to the area as well as to preserve the naturalness of the surroundings. Inevitably more alterations in the terrain will follow as the project continues with consequent changes in the composition of the flora and fauna, but these are not expected to be significant. It is hoped that this report will provide a basis for comparison at some future date.

METHOD AND CONDITIONS OF SURVEY

The area was visited on eight days during the 1966 season: May 17, May 26, June 14, July 26, August 9, August 31, September 12, September 20. The driving distance from the Plant Research Institute, Ottawa, via Highway 11 and Lac Ste Marie Road, to "Ryanville Corner" is 60 (av. 59.9 ± 0.8) miles, and required one and three-quarters to two hours each way, leaving 4 to 6 hours daily for field work. A total of but 22 hours were actually spent on foot, - trekking, observing and listing plants, photographing, and preparing specimens. Generally one site was "worked" in the forenoon and two or three sites in the afternoon.

Lists were made of all the species growing within a unit habitat, brief notes on abundance being entered. Samples suitable for herbarium preservation were taken from plants as convenient. During the course of the survey, 474 different collections were made representing nearly all the species encountered. Some species were gathered on more than one occasion. Specimens were made in unicate, or as many as 5 replicates, making a total of 928 sheets, a few with photographs. The reference set of the specimens, fully labelled, identified and mounted, is deposited for permanent preservation in the herbarium of the Plant Research Institute (Herb.DAO); the duplicate sheets will be distributed to other repositories. No botanical specimens were formerly available from this particular block of land although a good representation had been built over the years for the terrain both to the west, south and north.

The sites examined intensively were mainly near the Radar Road or adjacent to the old road through the valley on the north. These sites are indicated on the map. One trip for example, to the top of Trail 2, then over to the chair-lift anchor at Ryan Peak and on to the south crest beyond, took three hours to walk. No attempt was made to cruise predetermined transits in a routine manner; it was quite impossible to sample uniformly such a large tract in which some slopes were too

dangerous for casual wandering. Despite these limitations, it is believed that about 90% of all the vascular plants in the area, including all the common ones, were recorded. A stand of Jack Pine, large but localized on the steep west-flank, and the single patch of Bear-berry on the south-crest of summit might easily have been missed. Lack of detailed knowledge of the willow, sedge and fern flora may account for several species being overlooked. There is still leeway for others to add to and correct the present list.

Technical assistance was rendered by Fred Beales on all trips, by Ernie Small and Tom Adams on single trips; T. Mosquin attended the August 9 trip; other colleagues kindly checked the identification of specimens.

GENERAL FEATURES OF THE TERRAIN AND VEGETATION

Geography

Mont Ste Marie is in the southern part of Hincks Township, Gatineau County, Quebec. It can be reached only by the road around the north end of Lac Ste Marie and approaching from the north-west; the road is being improved. The peak proper, "Summit", is precisely 37.5 miles, N 10° W from the Peace Tower of the Parliament Buildings, Ottawa, and located at Lat. 75° 51' 02" W, Long. 45°55' 23" N. The 6 by 6 kilometer area designated for survey is bounded by grid-lines 31, 37, 84, 90 on sheet 30 G/13, LOW - WEST HALF. A simplified map of the survey block is given here. An aerial view (A 19518-125), encompassing most of this block and taken on 22 June 1966, is also reproduced. Aerial photographs taken at earlier dates, before the Radar Road was built, are available in the official files.

Geography and Soils

The bedrock is igneous, of Precambrian Age, and smoothed by glaciation. Glacial till is thin or lacking on the ridge tops and steep faces but lies deeply on some slopes where it is of sufficient depth and texture to be readily bulldozed for levelling purposes. The soil is classified as a Brown Podzolic, non-calcareous till, known as Gatineau Sandy Loam (see: Soil Survey of Gatineau and Pontiac Counties, Quebec. Can. Dept. Agric. publication (1962) 1964, by P.G. Lajoie).

Below about the 750 foot contour, the valley terrain was locally submerged in post-glacial times. The farmed land in the valley between about 485 and 550 feet on the Lac Ste Marie side, is therefore covered with lacustrine clay and silty loams, classified as Pontiac Clay Loam. The land above this valley deposit, up to the 750 foot level, is formed of conspicuous outwash flats or terraces of strongly bedded sands and gravels. Raging torrents from the hills were necessary to carry this coarse material out into the ancient lake. The main Lodge and resort-

centre are located on this outwash deposit on which it has been found relatively easy to prepare level areas and install services. There apparently had been early farm clearings on this deposit but due to its sterility the fields soon reverted to rough pasture and bushland and were in this condition at the time the Company took over. The brook from Lake Fournier, cuts deeply into this loose overburden. Another nearby brook, apparently issuing from springs in the same deposit, flows meandering in an equally deep ravine. The high area situated between these two streams, selected for private lots, supports a good coniferous stand of mature trees.

Vegetation

The terrain was originally all densely forested, mainly with deciduous trees (Maple, Beech, Birch, Basswood) mixed with conifers (White Pine, Red Pine, Spruce, Balsam Fir). The pines were cut out in the first days of lumbering 80 or more years ago; vestiges of the original stumps remain, badly rotted. Fires have razed all the terrain, various parts at different times, and with varying intensity. Charred stumps everywhere give evidence. The last fire in the survey area was about 40 or 50 years ago; a nearby ridge to the northwest was fire-swept some 5 years ago. Some of the ancient Sugar Maples and Beach in the sheltered valleys and moist slopes of the north side indicate the absence of fire for a very long time.

Four rough classes of forest vegetation are to be found. What may be called the climax type and that most extensive over the deeper soils is, as described above, dominated by Acer saccharum, Fagus grandifolia and Betula lutea with, formerly, Pinus strobus and Picea glauca. There is some Tilia americana, but Tsuga canadensis seems always to have been absent from this characteristic complex except on special sites. Viburnum alnifolium is a common spring-flowering shrub.

The second extensive type which possibly represents a successional stage after fires and persisting longer on shallower soils and exposed areas, is dominated by Quercus borealis, Acer rubrum, Betula papyrifera and Populus tremuloides. It has meagre amounts of Pinus and of the other deciduous trees mentioned above. The undershrubs are usually Corylus cornuta, Lonicera canadensis and Vaccinium myrtilloides.

Certain blocks of forest predominantly coniferous are scattered throughout the area, their ecological relationship being obscure. Pinus strobus and P. resinosa are the chief trees. This type of forest occurs both on the steep west-facing slope running up from the Lodge site, and on parts of the deep out-wash deposit at the base.

Exposure barrens, essentially treeless, are maintained on rock crests and smooth faces where erosion following fire has reduced the soil to practically nothing. In the ancient past, these areas were treed. Blueberries (Vaccinium spp.) Danthonia spicata, and various mosses and lichens give them their characteristic appearance. Quercus borealis, Betula

papyrifera and Amelanchier are trees which encroach to create a savanna, but remain sparse and stunted.

A cedar swamp restricted to the bottom of the gorge in the outwash deposit mentioned above, where tree roots are suspended over cold springy ground, may be considered a fifth distinctive type, but is of limited extent.

The distribution of species is not uniform up the slopes but no altitudinal zonation ascribable to difference in climate with elevation is exhibited. A few trees of Mountain Ash (Sorbus) occur at the top, and not below; Elm, Hemlock, White Cedar and numerous other species are present only at the base. Yet Beech, Sugar Maple, Striped Maple, Erythronium, various Asters and most other species are equally at home on the summits and at the base. There are some habitats at the summit (eg. small bog-holes and exposure faces) not found at the base and these harbor their characteristic species; at the base are alluvial deposits, springy ground, and sheltered slopes not available at the top. The disposition of such habitats, due to topography, is the cause of altitudinal floristic variation.

The richer flora at the base can also be attributed in part to migration-lag (or time), many low growing herbs seem not to have had enough time to spread upwards onto the slopes. The presence of Mountain Ash, as well as Arctostaphylos, an Amelanchier, and a few other rare species at the top, is attributed to bird-transported seeds, the plants having found on the summits perpetually open sites for persistence. Seedlings of Mountain Ash have been seen sprouting in newly disturbed soil at lower levels, but these would not survive long among dense vegetation. To repeat, there is no evidence of a climatic Boreal Forest zone at the summit as might be expected. It is true that the 'boreal' aspect of the landscape increases noticeably as one travels up the Gatineau valley, but solid 'boreal' vegetation does not become dominant for about another 50-100 miles north.

History

The Gatineau valley was penetrated in the early days of the pine timber trade in the 1850-60 period. Settlement on farms near the river and in the valleys followed, increasing after the railroad was built in 1891. By 1900, there were pioneer farms with large clearings scattered throughout the country, even back in the hills. Abandonment of farms on the less productive soils started in the 1920's; now many of the original log barns and farmsteads lie direlict, are falling down, or have completely disappeared. Cottagers and sportsmen belonging to fishing clubs started into the area after 1900, travelling by train to Kazabazua Station, then by horse-express. The road up from the cities was not made passable to cars until about 1930. Presently, water-front lots are at considerable demand.

The road from Lac Ste Marie to Jules at Lac Poisson Blanc across the N-base of Mont Ste Marie was made in the early days of lumbering. There seems to have been an early habitation, either a lumber shanty or farmhouse, at the point when this road forded the two creeks at the NW-base of the hill, with clearings where the entrance to the new Lodge site is now located. Garden perennials (things like lilacs, day-lilies, rhubarb, briar roses) as well as useful native species were carried far into the bush to beautify these isolated steadings. The concentration of Celastrus scandens, Juglans cinerea, Parthenocissus, and Prunus nigra in this vicinity and not in terrain in general points to such events. There also were woods-roads or winter-roads up from the farms to the gentler slopes of Mont Ste Marie and into the coves, but these are now quite overgrown, often only a few tolerant individuals of timothy, plantain and clover persisting.

The building of the Radar Road, accomplished by modern machinery, seems to have been a relatively phytosanitary undertaking and few weeds were introduced. The construction of the tower, the buildings and compound around it at the summit, however, allowed turning of vehicles and the unloading of material some of which (such as vermiculate) must have contained weed seeds. Infestations of far-transported weeds (eg. Spergula arvensis, Polygonum aviculare) are starting up there. In 1966, alien weeds were still remarkably scarce on the fill and gradings of the Radar Road below. Invaders of native origin rather, were rapidly colonizing this newly disturbed soil: Equisetum arvense, Agrostis scabra, Epilobium glandulosum, Rubus idaeus, Salix, Populus balsamifera, Polygonum cilinode, Juncus brevicaudatus, Carex houghtonii, etc. A sampling of a 1350-pace stretch of roadside, from the 1670 to 1400 ft. level, for alien weeds shows how few were present in 1966 (see appendix).

The ski-resort development started in the winter of 1965-66 by the cutting of trees on the surveyed runs, the merchantable logs beings drawn out in the spring. Stump-sprouts and released herbs soon made these strips verdant in the summer of 1966. Trails 1 and 2 were further bulldozed and levelled, creating broad stretches of fresh brown earth, naked up the hillsides. Much earth moving and road building also took place for installations around the base. Bales of hay were brought in for some purpose and piled along the Radar Road at points where the main trails crossed; seeds germinated in these by fall. The graded runs were seeded in late summer of 1966 to coarse grasses:- a commercial mixture of timothy and tall fescue. By the last visit on September 20 some germination had taken place, sufficient to give a fresh green cast to the seeded strips. Fortunately there had been no violent storms in the interval to wash the loose soil off.

Virgin soil so bulldozed provides a good bed for sprouting and establishment also of native species from the dormant seeds it contains. This effect was well demonstrated on areas disturbed the year or two previously along the Radar Road; seedlings of many of the trees and herbs came up in profusion, some of parent species not noticeable in the immediate forest. The current development could be followed as a gigantic experiment in ecological ecesis of native and introduced species.

Presence and Absence of Species

The native species represented in the Mont Ste Marie flora are those to be expected. No alien species are present in the undisturbed habitats.

The only strange species discovered which require comment are Calamagrostis inexpansa, not known to occur closer than Mt. Martin about 100 miles westward, and Lactuca hirsuta, not mentioned in the "Checklist of Plants of the Ottawa District" (J.M. Gillett, 1958).

Several species are rare at Mont Ste Marie, as they are elsewhere in western Quebec and adjoining Ontario: - Clematis verticillaris, Glyceria melicaria, Trillium undulatum, Habenaria hookeri, Lechea intermedia, Arctostaphylos uva-ursi, Hieracium canadense.

A few species seem to be running out at the northern limit of their range: Dicentra cucullaria, Cystopteris bulbifera, Caulophyllum giganteum, Oryzopsis racemosa, Lilium philadelphicum, Rhus radicans, Hystrix patula, Uvularia grandiflora, Waldsteinia fragarioides, Penstemon hirsutus.

Some special species known to occur in the Kazabazua area, 5-10 miles westward, are absent at Mont Ste Marie:- Convolvulus spithameus, Oryzopsis canadensis, Symplocarpus foetidus, Polygala paucifolia, Spiraea tomentosa, Prunus pumila, Amphicarpa bracteata.

Numerous species of the flora of the Ottawa district less than 30 miles to the south, are absent at Mont Ste Marie in similar habitats which is apparently just beyond their natural limit: Quercus alba, Juniperus virginiana, Ulmus rubra, Carya cordiformis, Hepatica americana, Caltha palustris, Potentilla tridentata, Dicentra canadensis, Sanguinaria canadensis, Panax trifolia, Asarum canadense, Viola canadensis, Polygonum douglasii, Acer nigrum, Hydrophyllum virginianum, Pedicularis canadensis, Senecio pauperculus.

The only noteworthy alien species is Epipactis helleborine, present in one woodland near Jules, where it must have arrived just a few years ago (it reached Ottawa in 1929). The other aliens are those to be expected.

The inventory of Mont Ste Marie lists 354 species.

Floristic List

The nomenclature and sequence is that of Gleason and Cronquist's Manual of Vascular Plants (1963), which work may be consulted for authorities of the names, for common names and botanical descriptions. For illustrations, Gleason's edition of The New Britton and Brown Illustrated Flora (1952) is recommended.

The categories for density: common, frequent, scattered, scarce and rare, are estimates of occurrence based on the area as a whole. Descriptive words such as abundant, dense, in patches, solitary, etc., are used in reference to the density in the particular site or habitat. An asterisk (*) indicates that no voucher specimen was prepared.

LYCOPODIACEAE

Lycopodium lucidulum - scarce; small patches in dry woods.

Lycopodium obscurum - scarce; patches in dry or sandy woods.

Lycopodium clavatum - rare; sphagnous pocket; sterile.

EQUISETACEAE

Equisetum arvense - common; spreading rapidly to disturbs.

Equisetum sylvaticum - frequent; moist woods and clearings.

Equisetum fluviatile - rare; wet stream-flush.

Equisetum scirpoides - rare; numerous mats in cedar swamp.

OPHIOGLOSSACEAE

Botrychium matricariaefolium - very rare; single in woods.

Botrychium virginianum - scarce; deciduous and moist woods.

OSMUNDACEAE

Osmunda regalis - scarce; in boglet at Summit only.

Osmunda cinnamomea - scarce; boggy pocket.

Osmunda claytoniana - frequent; stream-course woods.

POLYPODIACEAE

Pteridium aquilinum - common; woods, clearings, exposures.

Adiantum pedatum - frequent; rich deciduous woods.

Polypodium vulgare - common; rock faces and crevices.

Matteuccia struthiopteris - rare; moist ravines at base.

Onoclea sensibilis - frequent; wet openings.

Athyrium thelypteroides - frequent; deep woods.

Athyrium filix-femina - common; wet openings, moist woods.

Woodsia ilvensis - frequent; rock faces and exposures.

Cystopteris bulbifera - rare; spring-sides at base only.

Cystopteris fragilis - rare; sheltered N-facing rock-face.

Thelypteris phegopteris - scarce; rich woods in ravines.

Gymnocarpium dryopteris - scarce; moist woods in ravines.

Dryopteris marginalis - frequent; dry woods, rock openings.

Polystichum acrostichoides - frequent; dry deciduous woods.

TAXACEAE

Taxus canadensis - rare; wet woods at base only.

PINACEAE

Abies balsamea - frequent; mainly repressed, few large trees.

Picea glauca - frequent; some large trees.

Tsuga canadensis - rare; moist ravines at base, some large.

Pinus strobus - common; exposures mainly; cut-out early.

Pinus resinosa - common on exposure slopes, some large.

Pinus banksiana - local; large grove on W-exposure flank.

CUPRESSACEAE

Juniperus communis - rare; single on S-exposure face.

Thuja occidentalis - in deep ravine in sand at base only.

TYPHACEAE

Typha latifolia - scarce; wet openings and swamps.

Sparganium chlorocarpum - rare; in Fournier Stream."

NAJADACEAE

Potamogeton alpinus - scarce; in Fournier Stream.

Potamogeton foliosus - rare; in Fournier Stream.*

GRAMINEAE

Bromus ciliatus - rare; roadside thickets at base.

Glyceria borealis - rare; in Fournier Stream.*

Glyceria nelicaria - scarce; stream courses, boglet at Summit.

Glyceria striata - frequent in stream-course openings.

Glyceria grandis - rare; dense in Fournier Lake swamp.

Poa compressa - rare; rock openings below, Radar Compound.

Poa pratensis - rare; on exposure summits; common at base.

Poa alsodes - rare; streambanks in woods at base.

Poa palustris - common; exposure openings, wet clearings.

Dactylis glomerata - very rare; single clump on Radar Road.

Schizachne purpurascens - scarce; exposures, rocky woods.*

Agropyron repens - rare on Radar Road; common in fields.

Agropyron trachycaulum - frequent on exposure summits.

Elymus wiegandii - rare; two patches at Fournier Lake.*

Elymus virginicus - rare; Fournier Stream.

Elymus hystrix - local; beaver flood-out at Fournier Lake.

Sphenopholis intermedia - rare; wet rock face.

Danthonia spicata - common; abundant on exposure barrens.

Calamagrostis canadensis - scarce; open swales at Summit, base.

Calamagrostis inexpansa - rare; 3 patches on exposure flush.

Agrostis stolonifera - scarce by Radar Road; common at base.

Agrostis palustri. - rare; grav.. flush at Fournier Lake.*

Agrostis perennans - frequent; wet soil, shaded trails.

Agrostis hyemalis - abundant on disturbs; rare on summits.

Cinna latifolia - common; abundant in openings and thin woods.

Phleum pratense - frequent by Radar Road; common in fields.

Muhlenbergia glomerata - frequent; on exposure slopes.

Muhlenbergia mexicana - scarce; moist roadsides, disturbs.

Brachyelytrum erectum - frequent; patches throughout woods.

Milium effusum - rare; rich woods on Ryan Peak.

Oryzopsis racemosa - rare; one patch on gravel-cut at base.

Oryzopsis asperifolia - common; scattered throughout bush.

Oryzopsis pungens - rare; on an exposed granitic slope.

Phalaris arundinacea - rare; in Fournier Lake flood-out.*

Leersia oryzoides - rare; dense in Fournier Lake marsh.

Panicum depauperatum - scarce; exposure barrens.

Panicum lanuginosum - rare; gravel bank at base only.

Panicum xanthophysum - rare; margins of exposure barrens.

Setaria glauca - roadside weed at base.

Setaria viridis - roadside weed at base.

CYPERACEAE

Eleocharis acicularis - thick mat in Fournier Lake swamp.*

Eleocharis ovata - rare; edge of Fournier Stream.*

Scirpus cyperinus - frequent; swampy openings.

Scirpus atrovirens - scarce; swampy openings.

Carex stipata - in Fournier Lake flood-out only.*

Carex disperma - scarce; dense wet woods.

Carex trisperma - scarce; boggy pockets.

Carex canescens - scarce; wet openings, in dense clumps

Carex muricata - frequent; disturbed soil.

Carex deweyana - scarce; deep woods.

Carex argyrantha - scarce; in dense clumps on dry disturbs.

Carex communis - common; exposure barrens, open woods.

Carex umbellata - scarce; on exposed rock faces.

Carex plantaginea - scarce; rich deciduous woods.

Carex leptonervia - frequent; in rich woods.

Carex debilis - common; rich or moist woods.

Carex scoparia - frequent; moist soil at summit.

Carex houghtonii - frequent; large clones in disturbs.

Carex scabrata - frequent; open stream-courses and ditches.

Carex crinita - frequent; along stream courses.

Carex retrorsa - in Fournier Lake flood-out only.*

Carex intumescens - scarce; streambank woods.

ARACEAE

Arisaema triphyllum - frequent; moist woods, few flowers.

JUNCACEAE

Juncus effusus - scarce; soil washes, dense in flood-out at lake.

Juncus tenuis - scarce; soil washes.

Juncus dudleyi- rare; soil wash.

Juncus brevicaudatus - rare; abundant on a soil wash.

LILIACEAE

Lilium philadelphicum - rare; one clump on S-exposure slope.

Erythronium americanum - common throughout; very few flowers.

Clintonia borealis - common; very few flowers.

Smilacina racemosa - frequent; seldom flowering.

Maianthemum canadense - common; woods and openings.

Uvularia grandiflora - rare; rich woods.

Streptopus roseus - frequent throughout moist to dry woods.

Polygonatum pubescens - frequent in moist to dry woods.

Trillium grandiflorum - frequent in woods, mid to low slopes.

Trillium erectum - scarce; woods on lower slopes.

Trillium undulatum - rare; moist woods at one site.

Medeola virginica - rare; rich woods.

IRIDACEAE

Iris versicolor - scarce; Fournier Lake, boglet at Summit.

ORCHIDACEAE

Cypripedium acaule - rare; single in boggy pocket at Summit.

Habenaria obtusata - rare; in cedar swamp at base only.

Habenaria orbiculata - rare; single in dry woods at 1000 ft.

Habenaria psycodes - rare; moist woods at 1400 feet.

Epipactis helleborine - rare; numerous in rich woods, Jules.

Spiranthes gracilis - rare; single in dry woods at 1000 ft.

Malaxis unifolia - rare; scattered on exposure slopes.

SALICACEAE

Populus grandidentata - frequent; some large trees in woods.

Populus tremuloides - frequent; some large trees in woods.

Populus balsamifera - scarce as tree; many suckers by Radar Road.

Salix lucida - rare; clumps of suckers by Radar Road only.*

Salix serissima - rare; ditch of Radar Road only.

Salix bebbiana - common; exposures, clearings, Radar Road side.

Salix discolor - frequent; wet openings.

Salix humilis - frequent; exposure openings, usually wet.

MYRICACEAE

Myrica asplenifolia - rare; fringing rock exposure, S-face.

JUGLANDACEAE

Juglans cinerea - old clearings and along bush roads at base.

BETULACEAE

Corylus cornuta - common; clearings, thin woods, exposures.

Ostrya virginiana - frequent; dry woods; not flowering in 1966.

Betula lutea - common; some large trees.

Betula papyrifera - common; some near pure stands, trees small.

Alnus rugosa - dense along streams and wet places at base.

FAGACEAE

Fagus grandifolia - very common; dominant, gnarled by exposure.

Quercus borealis - common; dominant in upland woods and savannas.

ULMACEAE

Ulmus americana - scarce; wet woods and roads at base only.

URTICACEAE

Urtica dioica - rare; old woods road; at Fournier Lake.

Laportea canadensis - frequent; wet woods, stream courses.

Pilea pumila - rare; dense stand along a spring at base.

POLYGONACEAE

Rumex acetosella - rare; single plant by Radar Road.

Polygonum achoreum - rare; new weed at Radar Compound.

Polygonum aviculare - rare; new weed at Radar Compound.

Polygonum natans - in beaver swamp at Fournier Lake.

Polygonum hydropiper - rare; weed in spring.

Polygonum persicaria - rare; weed on old road at base at Summit.

Polygonum hydropiperoides - in beaver swamp at Fournier Lake.

Polygonum cilinode - common; abundant on rocks, clearings.

CHENOPODIACEAE

Chenopodium album - weed; rare at Radar Compound, common at base.

Chenopodium glaucum - rare; new weed in Radar Compound.

PORTULACEAE

Claytonia caroliniana - scarce; dense in rich woods at base.

CARYOPHYLLACEAE

Spergula arvensis - rare; one group at Radar Compound.

Stellaria media - rare; moist roadside at base only.

Stellaria graminea - rare; weed at entrance road.

Cerastium vulgatum - rare; weed in dozes along Radar Road.

Silene antirrhina - rare; gravel disturb at base.

Silene noctiflora - rare; weed along entrance road.

Silene cucubalus - common weed at base.

RANUNCULACEAE

Actaea alba - rare; rich woods at base.

Actaea rubra - scarce; rich or wet woods near base.

Coptis trifolia - rare; boglet at Summit, cedar swamp at base.

Aquilegia canadensis - frequent; on rock exposures.*

Ranunculus abortivus - rare; in wet woods at base.

Ranunculus acris - frequent; weed along old roads at base.

Ranunculus repens - rare; patch at bridge on old woodroad.

Thalictrum polygamum - scarce; streamsides, wet meadows.

Anemone cylindrica - scarce; roadsides, old clearings at base.

Clematis virginiana - frequent; along clearings at base.

Clematis verticillaris - rare; in poplar woods at base only.

BERBERIDACEAE

Caulophyllum thalictroides - very rare; rich woods at base.

FUMARIACEAE

Dicentra cucullaria - rare; dense in rich woods at base only.

Corydalis sempervirens - frequent; rock exposures, winter-annual.

CRUCIFERAE

Lepidium densiflorum - scarce; weed on road at base.

Capsella bursa-pastoris - rare; weed in Radar Compound.

Cardamine pensylvanica - rare, stream course on forest slope.

Dentaria diphylla - rare; moist woods, sterile.*

Arabis hirsuta - rare; abundant on gravel road doze at base.

Arabis holboelii - rare; localized on gravel ridge at base.

Nasturtium officinale - rare; in Fournier Stream.*

Barbarea vulgaris - rare; one plant on Radar Road side.

Erysimum cheiranthoides - rare; weed at Radar Compound.

SAXIFRAGACEAE

Saxifraga virginiensis - scarce; on rock exposures.

Tiarella cordifolia - common; in woods and on moist rocks.

Mitella diphylla - rare; rich woods.

Mitella nuda - rare; cedar swamp at base.

Chrysosplenium americanum - scarce, in woodland brooks.

Ribes cynosbati - scarce; rocky openings in woods.

Ribes lacustre - rocks in woods; cedar swamp at base.

Ribes glandulosum - frequent, on wet rocks in woods.

ROSACEAE

Spiraea latifolia - scarce; in Fournier Lake swamp.*

Fragaria vesca - frequent; rocky openings in dry woods.

Fragaria virginiana - frequent; rocky openings and clearings.

Waldsteinia fragarioides - rare; sandy woods at base only.

Potentilla norvegica - scarce; disturbed soil at summit.

Potentilla argentea - weed along road at base.

Geum allepicum - frequent; along Radar Road and in clearings.

Rubus alleghaniensis - frequent; a bramble in rocky openings.

Rubus canadensis - scarce; rocky thickets by Radar Road.

Rubus occidentalis - scarce; in soil dozes and clearings.

Rubus strigosus - common; exposures, vigorous on dozes.

Rubus pubescens - scarce; in soil flush; wet bush.

Rubus odoratus - common; sparse in woods, abundant in dozes.

Agrimonia striata - weed at stream ford at base.

Rosa acicularis - frequent on rocky exposures.

Prunus serotina - frequent; dry woods; some large trees.

Prunus virginiana - frequent; openings and dozes.*

Prunus pensylvanica - frequent; exposure openings and dozes.

Aronia prunifolia - rare; patch in trickle, S-crest of Summit.

Aronia melanocarpa - rare; patches in boglets at Summit.

Sorbus americana - scarce; small trees around Summit only.

Crataegus - rare; dry exposures, thickets at base; sterile.

Amelanchier canadensis - common; thin woods on rocks.

Amelanchier sanguinea - frequent; exposed rocky areas.

Amelanchier spicata - scarce; forming thickets at summit.

FABACEAE

Trifolium pratense - rare on Radar Road; abundant at base.

Trifolium repens - rare; weed at Radar Compound.

Trifolium hybridum - rare; weed at Radar tower; Sub-summit.

Trifolium agrarium - rare; weed at entrance road at base.

Melilotus alba - common; weed along roads at base.

Vicia cracca - common; weed along roads at base.*

OXALIDACEAE

Oxalis stricta - scarce, moist dozes along Radar Road.

Oxalis acetosella - rare; mats in cedar swamp.

GERANIACEAE

Geranium bicknellii - rare; exposure faces, No.3 Trail doze.

ANACARDIACEAE

Rhus radicans - rare; a weak patch in sandy woods at base.

Rhus typhina - common; exposes, barrens and dozes.

AQUIFOLIACEAE

Ilex verticillata - rare; in boglet on Sub-summit.

Nemopanthus mucronata - rare; in a boggy pocket at Summit.

CELASTRACEAE

Celastrus scandens - rare; vine in trees in clearing at base.

ACERACEAE

Acer saccharum - very common; the dominant tree, some large.

Acer spicatum - common; in openings along rock and streams.

Acer pensylvanicum - common; abundant throughout woods.

Acer rubrum - common; abundant in rocky woods and savannas.

BALSAMINACEAE

Impatiens biflora - common; dense stands in stream meadows.

VITACEAE

Parthenocissus quinquefolia - rare; on Elm by bridge at base.

TILIACEAE

Tilia americana - frequent; co-dominant in dry woods, large.

HYPERICACEAE

Triadenum virginicum - rare; thick in beaver-swamp at Fournier L.

CISTACEAE

Lechea intermedia - very rare; rock exposure.*

VIOLACEAE

Viola cucullata - scarce; in moist woods at base only.

Viola incognita (cleistogamous) - frequent; rich wooded slopes.

Viola pallens - frequent; in wet woods.

Viola conspersa - scarce; dry sandy woods at base only.

Viola pubescens - rare; rich woods at base and lower slopes.

THYMELAEACEAE

Dirca palustris - scarce; in thickets at base.

ELAEAGNACEAE

Shepherdia canadensis - scarce; exposure faces at low levels.

ONAGRACEAE

Epilobium angustifolium - frequent; woods (sterile) and dozes.

Epilobium palustre - scarce; wet dozes and swamps.

Epilobium glandulosum - frequent; abund. on dozes, wet clearings.

Oenothera biennis - frequent; dozes around Summit, Radar Road.

Circaea quadrisulcata - frequent; woods at base only.

Circaea alpina - frequent; thick along stream courses.

ARALIACEAE

Aralia nudicaulis - very abundant in woods th~ughout.

Aralia hispida - scarce; on dozes and rock exposures.

Aralia racemosa - frequent; rich woods, vigorous in clearings.

UMBELLIFERAE

Hydrocotyle americana - scarce; in springs, in cedar swamp.

Sanicula marilandica - scarce; dry bush at base only.

Osmorhiza claytonii - rare; rich woods at base.

Cicuta bulbifera - rare; Fournier Stream bank and swamp.

Pastinaca sativa - roadside & field weed at base.

CORNACEAE

Cornus canadensis - rare; bog pocket at Summit, cedar swamp.

Cornus alternifolia - scarce; roadside thickets at base.

Cornus rugosa - frequent; open lower slopes and clearings.

ERICACEAE

Monotropa uniflora - scarce; scattered in dry woods.

Monesis uniflora - rare; cedar swamp at base.

Pyrola elliptica - frequent; woods, seldom flowering.

Pyrola secunda - scarce; in sandy bush at base.

Gaultheria procumbens - frequent; open birch woods; on rocks.

Arctostaphylos uva-ursi - rare; mats on S-exposure at Summit.

Vaccinium myrtilloides - common; dominant on rock barrens.

Vaccinium lamarckii - scarce; rock barrens near top.

Vaccinium brittonii - rare; patches on exposure barrens.

PRIMULACEAE

Lysimachia terrestris - abundant in beaver swamp at base.*

Trientalis americana - common; throughout dry woods.*

OLEACEAE

Fraxinus americana - scarce; some large trees in ravines.

Fraxinus nigra - scarce; swampy woods, mainly at base.

APOCYNACEAE

Apocynum androsaemifolium - common; on exposures, bush at base.

ASCLEPIADACEAE

Asclepias syriaca - common; weed along roads at base.*

LABIATAE

Scutellaria lateriflora - rare; gravel flush at Fournier L.

Prunella vulgaris - weed along roadside at base.

Galeopsis tetrahit - scarce; by roads.

Lycopus uniflorus - scarce; wet soil at Summit, Fournier Lake.

Mentha arvensis - rare; wet clearing at Fournier Lake.

SCROPULARIACEAE

Penstemon hirsutus - rare; sandy clearing at base.

Verbascum thapsus - frequent; scattered weed along Radar Road.

Melampyrum lineare - rare; in dry woods.*

OROBANCHACEAE

Epifagus virginiana - scarce; patches in some beech woods.

PLANTAGINACEAE

Plantago major - scarce; weed along roads and trails at base.

Plantago rugelii - rare; weed along old road at base.

RUBIACEAE

Mitchella repens - frequent; dry woods; grove on sand at base.

Galium triflorum - common; in woods throughout.

Galium asprellum - rare; at bridge on Fournier Creek.

CAPRIFOLIACEAE

Viburnum alnifolium - common; abundant in woods, few flowers.

Viburnum acerifolium - rare; rocky woods, W-exposure.

Virburnum cassinoides - rare; in boglets around summit only.

Sambucus pubens - common; open rocks; growing vigorously.

Diervilla lonicera - common; exposures, clearings and dozes.

Lonicera canadensis - common; in woods, seldom flowering.*

Lonicera dioica - scarce; exposure, openings; no flowers.

Linnaea borealis - scarce; coniferous woods at base.

LOBELIACEAE

Lobelia inflata - scarce; soil flush, moist dozes, roadsides.

COMPOSITAE

Rudbeckia hirta - weed along old road at base.

Bidens cernua - thick stand in flood-out at Forunier L.

Bidens frondosa - rare; new weed on doze at 1000 feet.

Achillea millefolium - rare; weed around Radar Compound.

Chrysanthemum leucanthemum - weed along Radar Road and base.

Matricaria matricariodes - rare; new weed at Radar Compound.

Erechtites hieracifolia - rare; weed on doze at 1000 feet.

Solidago squarrosa - frequent on exposures and openings.

Solidago caesia - scarce; thin woods near base.

Solidago flexicaulis - rare; woods near Fournier Lake only.

Solidago nemoralis - rare; patch on S-exposure slope.

Solidago juncea - frequent; dozes and rock openings.

Solidago rugosa - frequent; roadsides, wet bush and clearings.

Solidago canadensis - frequent; moist dozes, sandy openings.

Solidago graminifolia - scarce; wet dozes.

Aster macrophyllus - very abundant in woods, clearings.

Aster cordifolius - frequent; thin rocky woods, clearings.

Aster acuminatus - very abundant in woods and rocky openings.

Aster puniceus - frequent; streamside at base, wet openings.

Aster umbellatus - frequent; boggy pockets, moist clearings.

Aster simplex - scarce; wet rock exposures.

Erigeron annuus - abundant weed along old wood roads at base.

Conyza canadensis - abundant new plants along Radar Road side.

Gnaphalium uliginosum - rare; new weed at Radar Compound.

Gnaphalium viscosum - rare; gravelly clearing by Fournier L.

Anaphalis margaritacea - frequent; in dozes, clearings at base.

Antennaria neglecta - scarce; on exposures, gravelly clearings.

Eupatorium maculatum - frequent; wet openings at base.

Eupatorium perfoliatum - rare; in swamp at Fournier Lake.*

Arctium minus - along old wood-road at base only.

Cirsium vulgare - rare; a plant by Radar Road.

Cirsium muticum - rare; along brook in cedar swamp.

Cirsium arvense - a few patches along Radar Road.

Prenanthes altissima - frequent; scattered through woods.

Hieracium aurantiacum - a patch on soil flush; weed at base.

Hieracium florentinum - frequent weed along Radar Road.

Hieracium scabrum - scarce; scattered in dry woods.

Hieracium canadense - scarce; a few plants on exposures.

Taraxacum officinale - scarce; a few new plants along Radar Road.

Sonchus oleraceus - rare; weed along old road at base.

PHOTOGRAPHS

1. View down Radar Road westward to farmland and village of Lac Ste Marie. July 26, 1966.

2. In spring the scattered spruce and pines show up in the predominantly deciduous woods. View from same site as Photo 1. May 17, 1966.

3. Old stumps on the summit indicate a former dense forest cover. White birch and red oaks start the new forest on the thin mantle of soil.

4. "Tower-view Site" on upper part of Radar Road. The road cuts through mature forest of sugar maple, beech and yellow birch. Roadside clearing has sprung up to native trees, shrubs and herbs from root sprouts and seeds.

5. Hobble-bush flowers conspicuously in the vernal woods. Here a branch sprawls across the trunk of an old yellow birch. May 26, 1966; specimen 21961.

6. Natural opening on rock slope. Mosses, lichens, poverty-grass and blueberries surround the bare rock. Shad-bush (in bloom) is scattered in the red maple, red oak, white birch woods. May 26, 1966.

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PHOTOGRAPHS

7. View northward down the main ski slope, freshly smoothed, to the site of the main resort lodge. The face of the hill in the distance was burnt-over a few years ago. July 26, 1966.

8. Native species rapidly invade the gravel roadsides: horsetail by deep runners; poplars, willows, raspberry and sedges from seed. June 14, 1966.

9. A large spruce, 50 or 60 years old, stands in an otherwise deciduous forest beside the rotted stump of a former pine. Typical species of clearings take over on the shallow rock: sarsaparilla, asters, bracken, pin cherry, raspberry, and bush-honeysuckle.

10. A spectacular monadnock rises above Fournier Lake on the shore of which an old forest has recently been killed by beaver-flooding. Typical marsh plants, cat-tail, bulrush, rice cut-grass and bur-marigold flourish on the altered shore-flat in foreground. September 12, 1966.

11. Pioneer farms on the sandy land in the valley have fallen derelict. An oat crop in the foreground.
September 12, 1966.

12. Clearing the ski-runs has yielded straight hardwood logs suitable for veneer. May 17, 1966.

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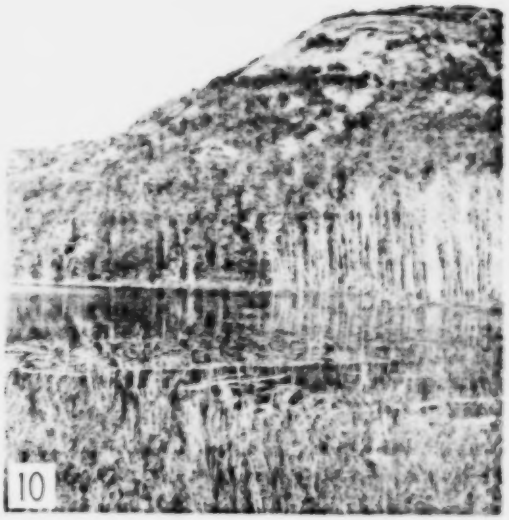

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Sonchus asper - rare; a few plants at Radar Compound.

Lactuca canadensis - scarce; old road at base, exposed crest.

Lactuca biennis - rare; along old road at base.

Lactuca hirsuta - very rare; single plant in new lot at base.

Cichorium intybus - weed of roadsides at base.*

MONT STE-MARIE---1966
Hincks Township, Gatineau County, Quebec
A floristic inventory of the 7X7 km. area at
45° 56' N. 75° 51' W. elev. 500-1830 ft.

QUEBEC, CANADA

All specimens resulting from the 1966 field-work bear labels of this format, the information up the left rubber-stamped in purple ink.

DEPARTMENT OF AGRICULTURE, OTTAWA, CANADA

APPENDIX: A sampling of alien weeds established along shoulder of Radar Road, on right side going down from about 1670' to 1400' level.

Interval (paces)	Number of plants per 50-pace samples																				Total	
	Agrostis gigantea	Phleum pratense	Cirsium arvense	Hieracium florent.	Trifolium pratense	Taraxacum offic.	Rumex acetosella	Galeopsis tetrahit	Chrysanth. leucan.	Oenoth. parviflora	Verbascum thapsus	Poa compressa	Agropyron repens	Sonchus asper	Trifolium repens	Achillea millefol.	Plantago major	Species	Plants
50	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
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250	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1
300	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	2
350	.	.	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	2	2
400	1	2	1	.	1	1	.	.	.	.	.	.	.	.	.	.	.	5	6
450	1	1	.	2	.	1	.	.	.	.	.	.	.	.	.	.	.	4	5
500	1	.	.	.	.	.	1	1	.	.	.	.	.	.	.	.	.	3	3
550	2	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	2	3
600	5	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	3	7
650	5	1	.	2	.	.	.	.	2	3	1	.	.	.	.	.	.	6	14
700	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	2	2
750	4	.	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	3	6
800	2	1	.	1	.	.	.	.	3	.	1	.	1	.	.	.	.	6	9
850	1	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	2	2
900	1	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	.	3	3
950	1	1	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	3	5
1000	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0
1050	.	.	.	6	.	.	.	.	.	.	.	.	.	.	.	.	.	1	6
1100	2	.	.	4	.	.	.	.	.	.	1	.	.	.	.	.	.	3	7
1150	2	.	.	1	.	.	.	.	.	.	1	.	.	.	.	.	1	4	5
1200	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	1	2
1250	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0
1300	.	.	.	2	.	.	.	.	1	.	.	.	.	.	.	.	.	2	3
1350	2	.	.	.	.	.	.	.	.	.	.	2	1	.	.	.	.	3	3
Freq.	18	7	2	9	2	3	1	1	3	2	6	2	2	1	1	1	1		
Plants	35	8	2	20	2	3	1	1	6	4	9	3	2	1	1	1	1		100

ADDITIONS: Mont Ste Marie list, 1966.

Habenaria hookeri - rare; single, dry woods at Ryan's Peak.

Prunus nigra - a few trees at old shanty site at base.

Lonicera hirsuta - rare; coniferous woods on sand at base.

Solidago puberula - frequent; rocky openings.

Solidago canadensis X juncea (B. Boivin det.) - single plant on Radar Road at Summit.